REMARKS

The present invention is directed to an electroconductive fine particle, a method of producing electroconductive fine particle, and an anisotropic electroconductive material.

In particular, the invention relates to an electroconductive fine particle having excellent electrical conductivity with fewer pinholes in a gold coating, a method of producing the electroconductive fine particle, and an anisotropic electroconductive material using the electroconductive fine particle. Further, the present invention aims to provide electroconductive fine particles having excellent electrical conductivity with fewer pinholes in a gold coating, a method of producing the electroconductive fine particles, which are cyan-free type with a plating bath excellent in stability, and an anisotropic electroconductive material using the electroconductive fine particles.

This Amendment is filed in response to the non-final Office Action dated October 29, 2007. The amendments and how they respond to the rejections set forth in the Office Action are explained below in detail. Accordingly, favorable reconsideration on the merits and allowance is respectfully submitted to be proper.

The Office Action indicated that claims 1 and 3 are rejected under 35 U.S.C. § 102(b) and that claim 2 is rejected under 35 U.S.C. § 103(a).

In the present Amendment, claim 1 has been amended to incorporate the subject matter of claim 2.

Claim 2 has been amended by deleting the subject matter that was incorporated into claim 1 and to further recite that the reducing agent is a sulfite salt. Support for this amendment can be found, for example, in the specification on page 9 at paragraph [0025]. No new matter has been

added. Entry of the Amendment is respectfully submitted to be proper. Upon entry of the Amendment, claims 1-3 will be all the claims pending in the application.

I. Response to Rejections Under 35 U.S.C. § 102(b)

Claim 1 was rejected under 35 U.S.C. § 102(b) as being unpatentable over U.S. Patent 4,711,814 ("Teichmann"), U.S. Patent 4,450,188 ("Kawasumi"), or U.S. Patent 5,882,802 ("Ostolski"). Particularly, the Examiner asserted that Teichmann teaches an electroconductive particle that has a gold coating formed over a solid nickel particle by an electroless plating method; that Kawasumi teaches a nickel core or copper core particle coated by gold, silver, platinum or palladium; and that Ostolski teaches electroplating gold onto nickel powder. The Office Action further indicated that the amount of nickel dissolved in a dissolution test of the electroconductive particle with nitric acid is an inherent property.

Applicant traverses and request reconsideration and withdrawal of the rejection in view of the following arguments.

Claim 1 is directed to an electroconductive fine particle, which has a gold coating formed by electroless gold plating on the surface of a nickel undercoating, the amount of nickel dissolved in a dissolution test of the electroconductive fine particle with nitric acid being 30 to 100 μg/g.

To achieve the requirements of claim 1, pinholes in a gold coating must be reduced. With respect to the Teichmann reference, Teichmann merely discloses common electroless gold plating methods. Namely, Teichmann teaches an immersion plating method.[1] Kawasumi teaches a nickel core or copper core particle coated by gold. Kawasumi also teaches coating methods

[1] See Teichmann at column 3, lines 20-33 and column 5, lines 12-13.

such as electroplating, vaccum deposition, and chemical plating. Ostolski simply discloses common electroless gold plating using "sodium citrate" or "sodium hypophosphate".

Accordingly, present claim 1 does not read on the electroconductive particle described in Teichman, Kawasumi and Ostolski.

Claim 3 was rejected under 35 U.S.C. § 102(b) as being unpatentable over U.S. Patent 6,838,022 ("Khanna"). The Office Action indicated that Khanna assertedly teaches anisotropic conductive material comprising gold-coated nickel particles suspended in a binder.

Applicant traverse the rejection and respectfully requests reconsideration and withdrawal of the rejection in view of the following remarks.

Claim 3 is directed to an anisotropic electroconductive material, which comprises the electroconductive fine particle according to claim 1 dispersed in a resin binder.

The technical feature of the anisotropic electroconductive material of claim 3 comprises the electroconductive fine particle which has a gold coating formed by electroless gold plating on the surface of a nickel undercoating, the amount of nickel dissolved in a dissolution test of the electroconductive fine particle with nitric acid being 30 to 100 μg/g.

Claim 3 does not read on Khanna because Khanna does not disclose every limitation recited in claim 3. Khanna describes an anisotropic conductive material comprising electrically conducting material suspended in a binder, wherein the electrically conducting material includes at least one of (i) nickel coated particles having a coating of noble metal, such as silver or gold, over the nickel coat and (ii) gold or silver coated nickel particles. Khanna does not disclose a gold coating formed by electroless gold plating; Khanna also does not disclose the amount of nickel dissolved in a dissolution test of the electroconductive fine particle with nitric acid being 30 to 100 μg/g. Accordingly, withdrawal of the rejection is respectfully submitted to be proper.

II. Response to Rejection Under 35 U.S.C. § 103(a)

Claim 2 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,711,814 ("Teichmann") in view of U.S. Patent 6,383,269 ("Toben"). The Office Action indicated that Teichmann teaches an electroconductive particle that has gold coating 11 formed over a solid nickel particle by electroless plating method. The Office Action conceded that Teichmann fails to teach a reducing agent causing an oxidation reaction on the surface of a nickel undercoating, but not causing an oxidation reaction on the surface of gold as deposition. However, per the Examiner, Toben cures the deficiency of Teichmann.

Applicant traverses and respectfully submits that the rejection should be withdrawn in view of the following remarks.

In the method of producing the electroconductive fine particle of claim 2, a sulfite salt is used as a reducing agent. This reducing agent causes an oxidation reaction on the surface of a nickel undercoating, but does not causes an oxidation reaction on the surface of the gold as a deposited metal. According to this substrate-catalyzed reduction type electroless gold plating, unlike the substitution type electroless gold plating, the plating bath is not contaminated with dissolved undercoating nickel ions, and unlike the autocatalytic reduction-type electroless gold plating, the plating bath is excellent in stability without decomposing and depositing gold in the plating bath.[2] According to this substrate-catalyzed reduction-type electroless gold plating, pinholes in a gold coating can be reduced.[3] As a result, an electroconductive fine particle, which has a gold coating formed by electroless gold plating on the surface of a nickel undercoating, the

---

[2] See Specification on page 7, paragraph [0020].

[3] See Specification on pages 6 and 8 at paragraphs [0018] and [0023], respectively.

amount of nickel dissolved in a dissolution test of the electroconductive fine particle with nitric acid being 30 to 100 μg/g can be obtained.

Teichmann only discloses common electroless gold plating methods. Namely, Teichmann teaches an immersion plating method.[4] Toben only discloses a method for producing a protective immersion gold coating onto nickel containing substrate. In Toben, "hydrazine and hydrazine derivatives" or "hydroxylamine and salts or other derivatives" are used as a reducing agent. However these reducing agents are not used as catalysts in the oxidation reaction on the surface of a nickel undercoating, and do not cause an oxidation reaction on the surface of gold as deposited metal. Accordingly, Toben does not cure the deficiency of Teichmann.

Furthermore, Teichmann alone or in combination with Toben does not describe, teach, suggest or otherwise give reason to combine to references to achieve the method of producing the electroconductive fine particle as recited in claim 2. Withdrawal of the rejection is respectfully requested.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the local Washington, D.C. telephone number listed below.

---

[4] See Teichmann at column 3, lines 20-33 and column 5, lines 12-13.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

Joseph J. Ruch, Jr.
Registration No. 26,577

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: February 29, 2008